

De Bruyne S., Smeets P., Van Damme N., Ceelen W., Van de Wiele C., Laurent S., Geboes K., Mertens J., Peeters M. Preoperative chemotherapy for colorectal liver metastases: prediction of response by DCE-MRI and FDG-PET/CT? *European Journal of Nuclear Medicine and Molecular Imaging* 2011; 38 (S2): S159. European Association of Nuclear Medicine Congress, October 2011, Birmingham, UK.

Background: Bevacizumab prolongs overall survival and progression-free survival (PFS) when added to standard chemotherapy. The present study assessed the role of [18F]FDG-PET and DCE-MRI for evaluation of response to bevacizumab treatment and for prediction of PFS in liver mCRC patients.

Methods: Eighteen mCRC patients were treated with folfox or folfiri and bevacizumab. [18F]FDG-PET and DCE-MRI scans were performed before treatment (baseline) and median 15 days after cycle 5 (follow-up). An additional DCE-MRI scan was performed after 1 cycle of chemotherapy (early follow-up). PET results were quantified by calculating SUVmax. The pharmacokinetic Tofts model was used to calculate Ktrans (expressed as 1/min/1000) for quantifying the DCE-MRI scans. In addition, the semi-quantitative parameter AUC (expressed as AUC/100) was determined. Seven weeks after the last chemotherapy, 16 patients underwent surgical resection of the liver metastasis. PFS was defined as the time from start of treatment to the date of first documented disease progression.

Results: Median PFS was 10 months (IQR: 8-13.5). The median baseline AUC (155; IQR:103-202) was significantly decreased at both the early follow-up (135; IQR:82-171 p=0.016) and the follow-up scan (127; IQR:85-148; p=0.004). Ktrans on the other hand showed no significant change upon chemotherapy treatment. Using the Cox proportional hazards model, the follow-up Ktrans (HR 1.009, 95% CI 1.002-1.016, p=0.015) was a significant predictor for PFS. This PFS benefit for lower follow-up Ktrans was also observed with the Kaplan-Meier log rank test. In addition, the Kaplan-Meier log rank test showed a PFS benefit for patients with >20% reduction in their Ktrans at the follow-up scan (p=0.025). AUC was not valuable for predicting PFS. The median baseline SUVmax was 5.17 (IQR: 3.60-8.42) and median follow-up SUVmax was 2.97 (IQR: 2.40-5.94; p=0.031). The Kaplan-Meier log rank test showed a PFS benefit for patients with lower follow-up SUVmax (p=0.009). There was no correlation observed between baseline SUVmax, Ktrans and AUC or in %change of these parameters.

Conclusion: Our results suggest that Ktrans could be a predictive variable for progression in mCRC patients who underwent curative liver surgery. In addition, the follow-up SUVmax seems to be a promising predictor of PFS. DCE-MRI parameters and the [18F]FDG-PET variable SUVmax are not correlated.